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ORIGINAL ARTICLE

ACADEMIC SUCCESS AND FAILURE AMONGST DENTAL STUDENTS: A MIXED METHODS STUDY OF WHAT MATTERS

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ABSTRACT

OBJECTIVE: To explore various factors affecting academic success & failure among public sector dental students.

METHODS: This mixed-methods study with explanatory sequential study approach was completed in May 2021 at Bolan Medical College, Quetta, Pakistan. After taking informed written consent, qualitative & quantitative questionnaires were distributed among 3rd year dental students. Quantitive data was analyzed through SPSS version-20. Qualitaive data was analysed through thematic analysis to identify themes and subthemes.

RESULTS: Out of 28 dental students, majority (n=15; 53.6%) were females. Passing percentage of female students was high (n=14/15; 93.33%) as compared to males (n=7/13; 53.85%). Failure was 6.6% (n=1/15) in girls and 46.15% (n=6/13) in boys. In annual exams, 75% (n=21/28) students passed in all subjects. About 89.3% (n=25/28) of successful students were satisfied with teaching strategies, 85.7% (n=24/28) reflected on their learned material, 75% (n=21/28) recalled prior knowledge, 67.9% (n=19/28) were hard-working, 71.4% (n=20/28) were internaly motivated whereas 67.9% (n=19/28) were confident about their abilities. Instrumental design, personal issues and learning environment were the main themes identified. Sub-themes for instrumental design were teaching strategies, overload curriculum & exam strategies; for personal issues were learning style, lack of sleep, coping strategies, class attendance, stress & motivation/interest and for learning environment were students' centered, assessment-centered and teachers' centered.

CONCLUSION: Successful students acknowledged the motivation, educational environment and innovative teaching strategies as contributing factors to their success. Hostel issues, lack of sleep, learning strategies, lack of interest in dentistry, anxiety, and parental education were the main elements among the academic failures.

KEYWORDS: Students, Dental (MeSH); Education, Dental (MeSH); Academic Performance (MeSH); Academic Success (MeSH); Academic Failure (MeSH); Motivation (MeSH); Teaching strategies (Non-MeSH); Pakistan (MeSH).

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INTRODUCTION

Researchers have identified several elements influencing the academic success or failure of medical students.[1,2] Successful students attribute internal motivation, family support, interest in subjects and teaching and learning methodologies, etc. as a key to their success.[2,3]

In case of unsuccessful students assign personal (lack of motivation, study skills, family burdens) and/or environmental factor/s (curriculum, assessment, learning environment, educational guidance, teaching methodology, hostel life, parental non-medical background) luck, lack of sleep and stress to their poor academic result.[1,3-6] Although many Pakistani researchers have assessed factors affecting the failure of medical and dental students[1,2,6] however, in Balochistan no work has been done on this issue so far. Our country has a different ethnic population with a variety of contrasting cultures and has a peculiar social, working, cultural and academic environment in different geographical areas. Balochistan is a resource-constrained tribal society where the working and educational domain are heavily influenced by tribal values.[7]

The present study was conducted to determine the factors which could identify factors affecting the success and failure of students in Bolan Medical College, Quetta, Pakistan which is the largest medical and dental college in the public sector in Balochistan. We anticipated that due to different academic environments the relevant success/failure factors might be different from other colleges. No such study has been analyzed in past in our dental college. Academic performance plays a crucial role in future success with high performing students likely to have a better chance of employment as well as more focused understanding of newer technologies and 21st century skills. With the changing paradigm of education from teacher centered behavioral approach to a student-centered constructive approach it is imperative to identify gaps in learning and teaching strategies to inform on policies and plans addressing student academic achievement/failure. Students

are at the center stage of all academic activities and hence a deeper appreciation of their perceptions is required to identify possible reasons for their performance. This study is likely to provide data and guidance to educational policy makers in dental schools and perhaps other related institutions for devising better and improved educational strategies.

Based on the results of the study, we would formulate a strategy for improved teaching/learning and a better examination system for the University. The results of this study will assist in the preparation of evidence-based guidelines that helps in dealing with failure students in academics, assists teachers preparing strategies helpful in learning these students, and guide parents in dealing with their children. Additionally, the data gathered may facilitate the development of needbased remediation programs. This study was therefore planned to find the factors affecting the academic success and failure of dental students in a public sector medical and dental college.

METHODS

Explanatory sequential study approach of mixed methods research was used. A mixed-method research was conducted during the month of May 2021, on all (n=28) 3rd year students of dentistry, at the Dental Section, in Bolan Medical College, Quetta, Pakistan. Study was approved by ethical review board (00010/BUMHS/IRB/8/21, Dated 8.5/21) of Bolan University of Medical and Health Sciences.

Inclusion criteria: All 3rd year dental students were eligible to participate in the study.

Exclusion criteria: Refusal to give informed consent, absent during the study period days, academic years other than 3rd year.

After the result of third year bachelor of dental surgery (BDS), all 28 students were asked to fill the consent form and a pre-validated qualitative and quantitative questionnaires (qualitative questionnaire validated by Mirza IA in 2018 in Karachi,[1] whereas quantitative was validated by Ahmady et al). Confidentiality of the students was ensured. By applying Non-probability consecutive sampling quantitative data was collected within an hour by the principal investigator and a senior demonstrator in lecture hall during oral pathology lecture time on 4th May 2021 for quantitative data and 11 May 2021 for qualitative data.

In the first phase of the study, quantitative data was collected within one day by using a structured and validated questionnaire prepared by Mirza IA.[1] Questionnaire has two parts, first part recorded demographic qualitative (gender) & quantitate data (age in years, hostel/home resident, parental education status) of participants. Second part consists of 14 questions including; 1. Motivation. 2. Hard-working 3. Confident. 4 Skilled teachers 5. Interest in dentistry 6. Cooperative faculty 7. Assessment techniques 8. Educational environment 9. Teaching techniques 10. Hostel environment 11. Manage Stress 12. Health issues 13. Financial Constrains 14. Peer assistance were recorded using a five-point Likert scale; 1= strongly disagree (SD), 2= Disagree (D), 3=Neutral (N), 4= Agree (A), 5= strongly agree (SA). The information collected was analyzed by using SPSS-23. Likert scale variables were recorded for further analysis by combining categories 'agree' and 'strongly agree' into a single group 'agree recoded 3, category 'strongly disagree' and 'disagree' into a single category i.e., 'disagree' recoded 1, while 'neutral' was retained and recoded 2. Qualitative variables were presented by calculating frequency and percentages and Mean and SD was calculated for continuous variables. Comparison of proportions has been done along with correlation between gender and perceptions analyzed. Chi square test was therefore used to analyze data (Recommendation base on Richardson JTE (2011). The analysis of 2 x 2 contingency tables - Yet again. Statistics in Medicine 30:890). A p-value of < 0.05 was considered significant for all analyses.

In 2nd (Qualitative) phase of the study, a semi-structured questionnaire formulated by Ahmady et al[5] (quantitative questionnaires were used in Iran [Asian context] and was easy to understand by the study participants, two medical educationists check its content and face validity) was distributed to the students in the lecture hall , half an hour was given to them to fill the questionnaire after one week of distribution of the quantitative questionnaire by the demonstrator during lecture timing to probe in-depth significant factors affecting participants' success and failure in annual exams. Qualitaive data was analysed through thematic analysis to identify themes and subthemes.

RESULTS

Out of 28 students, 15 (53.6%) were females and 13 (46.4%) were males. Majority (n=19/28, 68%) were 20 years old. Mean age of participants was 20.107±.566 years. Seventy-five percent (n=21/28) of students passed in all subjects in the annual examination. Passing percentage of female students was high (n=14/15; 93.33%) as compared to 53.85% (n=7/13) males. Failure in girls was 6.6% (n=1/15) as compared to 46.15% (n=6/13) in boys.

About 89.3% (n=25/28) of successful students were satisfied with teaching strategies, 85.7% (n=24/28) reflected on their learned material, 75% (n=21/28) recalled prior knowledge, 67.9% (n=19/28) were hard-working, 71.4% (n=20/28) were internaly motivated whereas 67.9% (n=19/28) were confident about their abilities. A statistically significant correlation was observed on item number 7 "Time management" ($p < .001$). Female students complained of an unsuitable hostel environment as compared to boys hostel residents ($p = < 0.007$). The comments of successful students are presented in Table I.

Themes were developed according to the perceptions of participants which included; instructional causes, personal causes, and learning environment (Figure 1). These themes were further divided into sub-themes. Subthemes are designed according to the views of failure students about their academics. Teaching strategies, assessment methods and over-loaded curriculum all were assigned to instructional design. In

TABLE I: DISTRIBUTION OF SUCCESSFUL STUDENT'S COMMENTS

S. No	Items	Students comment and percentagealong with Mean and Medican				
		Agree + Strongly Agree	Neutral	Disagree+Strongly Disagree	Mean	Median
1	Interest in my studies	20 (71)	4 (14)	4 (14)	3.0	2.6
2	I am a hard-working student	21 (75)	7 (25)	0	2.0	2.0
3	I am confident in my abilities (Self-efficacy)	20 (70)	5 (18)	3 (11)	2.1	2.0
4	I like my teachers in terms of their knowledge, skills, and attitude	19 (67)	5 (18)	4 (4.3)	2.2	2.0
5	Internally motivated	20 (71.4)	4 (19)	4 (19)	1.7	1.0
6	Cooperative faculty	17 (60.7)	6 (21.4)	3+2=5 (18)	2.4	2.0
7	Helpful educational environment that engage me in learning,	22 (78.6)	6 (21.4)	3+3=6 (20)	2.7	2.0
8	Discussion with peers and teachers helps in exam preparation	16 (57)	3 (11)	4+5=9 (32)	2.7	2.0
9	Tests, Module exams assists in exam preparation	16 (57)	5 (18)	5+2=7 (25)	2.0	2.0
10	Financial constrains	20 (64.3)	8 (28.6)	2 (7.1)	3.0	3.0
11	Living environment of hostel is hampering/ uncomfortable	15 (53.6)	5 (18)	4+9=13 (46)	3.4	3.0
12	I am able to manage time properly	12 (42)	6 (21.4)	6+4=10 (36)	2.9	3.0
13	My class fellows are helpful in my studies.	14 (50)	4 (14.3)	8+2=10 (36)	2.9	2.5
14	I can manage stress/anxiety by myself.	13 (46)	5 (18)	6+4=10 (36)	3.0	3.0

the umbrella of personal issues learning style, sleep deprivation, class attendance, etc were adjusted and finally the theme of learning environment consists of sub-themes including students-centered, assessment–centered and teacher-centered.

Qualittative pahse presents "Perception of successful candidates are demonstrated in Figure 2"

Majority (90%) of the successful students accept good teaching strategies were helpful in their academic success. They said "innovative teaching methodology" that is combination of powerpoint presentations, reflective work, Question-answer session during lecture" all enahance reterval of their learning.

Most of them (86%) accept that "reflective writing" is very effective way for memorizaing new and old learning material. Sevent six of them admit that "Question-answer, reflective writing and drawing histopathological diagrams all helps in recalling prior knowledge."

Sixty six of them found "Power point presentation", an effective tool of teaching when illustartions and text are merged in it.

During compiling qualitative results of failure students we detected different views about the unsuccessful results (25%, n=7/28). All of them (n=7/7) suggested that "an overloaded, extensive curriculum and time management were the major elements in the academic failure. They said they could not manage time between rotations and subjects' course content (general surgery, general medicine, oral pathology & oral medicine), simultaneously."

These students identified and admit that they are "distracted by watching television and using cellular phones." They said that these gadgets negatively impacted giving appropriate time and concentration to studies.

We detected "stress" as a major confounding factor in failure of third year BDS students. Eighty-six percent failure students (n=6/7) said that "during exams we are unable to take a nap which further deteriorates our stress levels and causes headache". These 86% students believe that their illiterate parents, either one or both, are unable to understand the stress of studies so they couldn't provide adequate facilitation/motivation during the examination. Some students (n=5/7, 71.42%) recognized poor learning/study strategy as a cause of their unsuccessful academics results. They said "we were unable to familiarize themselves with the learning environment during their session." About 42.9% (n=3/7) recognized lack of interest and insomnia as a cause of failure. They declared "we faced parental pressure to take admission in dentistry although we were not interested in this field. This further lowered their interest/motivation. One student (n=1/7, 14.28%) clarified his position. He said "lack of attraction in dentistry was the main cause of my low-class attendance.

Other causes of failure include hectic hostel life; problems associated with its mess. One of the female students was pregnant during her last semester, she considered this pregnancy as a cause of her failure in final exams.

DISCUSSION

Results of previous studies demonstrated that the number of females is rising in every profession due to their high willpower, constant hard work, sense of responsibility, or the importance of literacy.[8-12] This trend is also switching to the positive side in

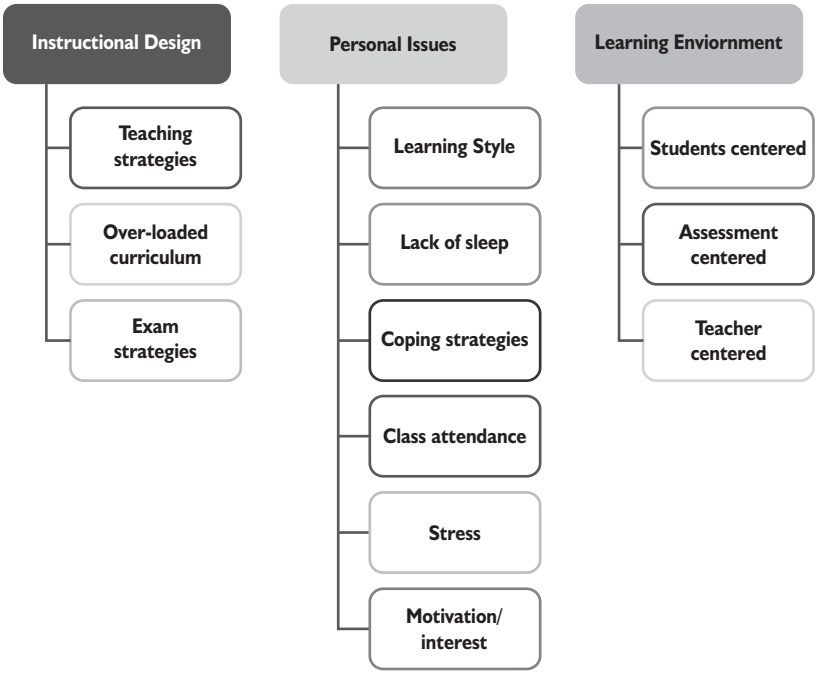

Figure 1: Themes formulated to assess "Causes of Students Failure"

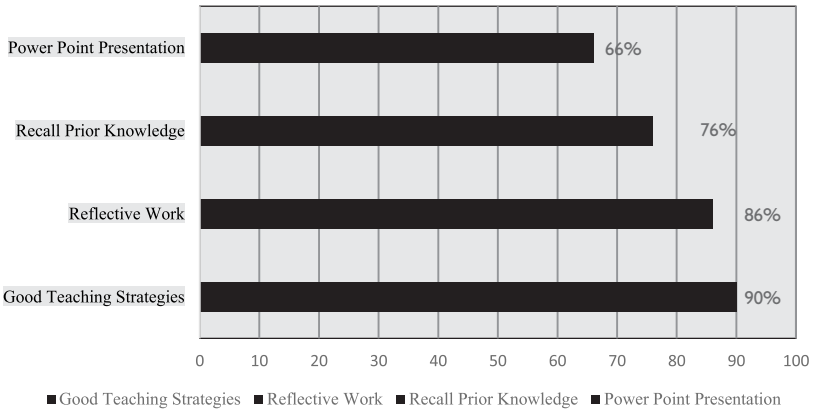

Figure 2: Perceptions of successful students

Balochistan as females due to their hard-working quality and great determination are taking the place of males in medicine and dentistry.[9,13] The results of the current study confirm females' predominance in dentistry (53.6%, n=15/28) which is correlated with Patel et al (females n=2/3)[14] and Luqman (72% females, n=314/436). On the contrary, studies conducted by Kiran[3] (Army Medical college, Army Medical College) and Shaikh G[2] (University of Lahore) in their study found less than 50% females.

In the current study, 67.9% (n=19/28) of participants were around the age of 21-22 years which is slightly less than that of participants of Shaikh G from University of Lahore who were around 23-25 years old. The age difference may be due to differences in professional years.[2]

Seventy-five percent of hard-working students were successful in academics, with a little difference of 71.4% attributing their confidence to their abilities which affect their academic results. Similarly, 86% of study participants in Mirza's study responded that their success was a result of their hard work and 84% of them were confident in their abilities.[1]

Motivation drives metacognitive skills; which plays a pivotal role in medical students' academic results.[15,16] It activates learning and analytical expertise, to store metacognitive skills, empowering one's level of ability to learn and create.[17] Application of different learning strategies, assist in the completion of assignment/s perfectly, targets execution and attaining the unquestionable standard of proficiency in their effort, thus obtaining essential positive results in learning and academics.[15,16,18-21] With a low female literacy rate in Balochistan as compared to other provinces, female students despite being internally motivated, confident and hardworking are facing and competing with their male counterparts for social, financial, and cultural challenges.[9] Asia-Pacific female students are close to and are encouraged by their families and by society to pursue careers that are relatively stable, safe, and offer high rewards.[16] Among such careers, medicine is one of the most popular.[15,19,21] Mirza et ali[1] in their research found a high percentage (76%) of internally motivated respondents. Approximately similar results were observed in our study, 71.4 % students demonstarates internal motivation as a key to their success, of these 46% (n=13/20) were males and 53% (n=15/20) were females. This is a significant step forwards in the strict tribal cultural background which generally discourages female participation.

Lack of motivation/interest predicted poor performance and especially low attendance. Only three males (21%) and one female (4.7%) student presented a lack of motivation. On the contrary students from University of Lahore attributed a lack of internal motivation as a major factor in their academic failure.[2] Lack of attraction towards a subject leads to deficient attendance in classes which resulted

from parental pressure to take admission in dentistry although students were not interested in this field, this caused their low internal motivation and they were not ready to learn dentistry. However, only a few (n=3/7) accepted lack of interest in dentistry, the role of parental education, and attendance issues work as co-factor in their poor academic performance. Uneducated parents who neither understood the examination anxiety nor could they facilitate these poorly performing students during the academic session were also identified as a contributing factor. The pivotal role of parental support and a strong positive bond between students and their parents has been identified as a major contributor to the academic success of students.[22]

During analysis of qualitative data, it was found that lower performers (n=7/28) quoted personal factors (financial, time issues, family matters, lack of interest, etc.), strikes (by administrative staff& faculty), as well as academic factors (assignments, tests, grades, back-to-back classes, fear of failure, curriculum load, faculty-student or student-student relationship, etc.) in this scenario. The main contributing elements to their failure were the overloaded curriculum and time management (n=7/7). The study participants of Kabir H from Bangladesh, Kiran from Rawalpindi, and Shaikh G from Lahore confirmed the results of the current study, as participants identified inappropriate and non-attractive curriculum as a major cause of failure in examination.[2,5,23] Themes of Dadpe qualitative study also observed Learning strategies, Resources, Psychological aspects, and Environmental factors affects students academic failure. Majority of the study participents admit positive enviornmental support form their family, educational institute and community. Positive and cooperative family attitude help failures to compete with their deficiencies. researches confirmed effective teaching strategies assist in students good academics.[24]

Stress and ineffective study strategy were the second major element in failure. Eighty-six percent (n=6/7) of students admitted they were under stress during the session and preparation leaves before the examination. Controversily Shehzad S et al recognized type A personality with stress and found them successful in academics (n=33/42, 78.6%). The difference between our results and the result of Shehzad may be due to the literacy rate that is much high in Peshawar as compare to Balochistan as well as parental education which demonstrates a positive effect on students academics and presents copperative behavior with students.[25] Boarders in hostels had some additional factors contributing to their stress.[24] This is because of the hostel life apart from the family creating homesickness adjustment to a new atmosphere with new social relationships, changed and sometimes unaccepted food quality, peer pressure, roommate issues, along with the absence of social support from warden/peers/roommates that makes them emotional/stressful/ depressed or in anxiety.[25] Furthermore, some of our study participants watched Television and used mobile which were distractors and caused a waste of time and concentration on their studies. The use of online social networks harms time management and study habits. Researchers observed a correlation between excessive use of online social networks and a decline in academic results. It also causes disturbance in sleep patterns, dietary habits, and time management resulting in academic failure.[2,26] In the current study 71% of students (n=5/6) admitted lack of sleep and distracting learning environment. Distracting and unfamiliar learning environment does not allow them to take an evening nap, which further enhanced their stress and caused headaches and poor concentration too.[6] Researchers recognized poor academic records are associated with poor sleep quality, especially in clinical years.[6,27]

CONCLUSION

Successful students found motivation, educational environment and self-awareness as key features in their academic success. They recognized innovative teaching and learning strategies (reflective work, powerpoint lectures, question/answer sessions during and after lectures) assist in self-directed and lifelong learning. Failures identified personal, enviornmental and instructional design as a barrier to their academic failure. Hostel issues, lack of sleep, learning strategies, lack of interest in dentistry, anxiety, and parental education were the main elements among the academic failures.

Recommendations for Unsuccessful Students:

1. Educational Diagnosis: There should be a student support program to identify students who are in difficulty; for this purpose, after formative assessment failing students (red line) students should be identified and provided extra time/support/help in the form of revision tutorials, mentoring sessions and their feedback should be sought for regularly.

2. Management: There should be a student support program as is advised by the world federation of medical education WFME.[28]

3. Implementation of Individual Management Program: These students should discuss personal problems with clinical psychologists and institutions should take appropriate action in the line with their recommendations.

4. Counselling Programmes for Stress Management: For stressful students proper student counselling sessions should be done in institute, to help them relieve from their stresses. Atmosphere should be developed so that stressful students share their problems with their teachers/faculty members.

5. Teaching and Assessment Methodologies: To assist learning different teaching and assessment methodologies should be considered that covers different learning styles of the students.

Strengths of the study

This study would help in making guidelines and policy decisions by the management and medical education departments of dental colleges across the country.

Limitations of the study

This study has a small sample size and is limited to the opinions of third year dental students of a single institute. Inclusion of all four year BDS students

EDUCATIONAL DIAGNOSIS AND MANAGEMENT PLAN

S. No	Problem List	Action Plan during Educational Diagnosis
1	Recognized lack of teaching	Arrange tutorials for educational support
2	Unconfident	Provide opportunities to execute under exam conditions"
3	Unable to understand oral pathology	Make lectures interesting by adding images and videos, ask them to reflect enhance memorization
4	Stress	Concern with mentor
5	Financial constraints	Arrange scholarships for these students
6	Accommodation Issues	Students living far away from college/university should provide hostel accommodation to give relief of their stress due to daily outback

might be different and the percentages may fluctuate from overloaded curriculum and time management to stress and depression, lack of sleep and vise virsa.

For more comprehensive and generalized results other medical college of Balochistan as well as Pakistan should be considered.

No attempt was made to in corporate the perceptions and opinions of faculty about the students

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AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under:

NFK: Conception, analysis and interpretation of data, drafting the manuscript, approval of the final version to be published

MS: Acquisition of data, drafting the manuscript, approval of the final version to be published

RK: Study design, drafting the manuscript, critical review, approval of the final version to be published

AKB: Study design, analysis and interpretation of data, critical review, approval of the final version to be published

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

CONFLICT OF INTEREST

Authors declared no conflict of interest

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DATA SHARING STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request

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